AN ANALYSIS OF
CARCINOMA TONGUE

Dissertation submitted to

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CERTIFICATE

This is to certify that this dissertation in **"AN ANALYSIS OF CARCINOMA TONGUE"** is a work done by **DR. SANTHI,** under my guidance during the period 2005-2007. This has been submitted in partial fulfillment of the award of M.S. Degree in General Surgery (Branch – I) by the Tamilnadu Dr. M.G.R. Medical University, Chennai – 32.

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CONTENTS

INTRODUCTION

Carcinoma of tongue, one of the commonest site for malignancies of oral cavity has gained importance by virtue of the organ's anatomical and functional importance. Along with other cancers of oral cavity like cheek, floor of mouth, lip it has a deleterious effect on functions like swallowing, speech, taste and respiration.

The presence of premalignant conditions has provided the way for early detection of susceptible persons. With changing life style and increased incidence of tobacco abuse the tongue cancer is on the rise. It is of interest that an increase in tongue cancer has been reported among young adult men. The median age for individuals with tongue cancer is approximately 40 years. Knowledge of tongue's anatomy along with neck nodes, about 200 in number, is of utmost importance for managing these lesions and to get a better loco-regional control, as most of the failures occur in this level.

As with other oral cavity cancers, carcinoma tongue patients, also have the likelihood of developing a second primary tumour elsewhere in the upper aerodigestive tract. This has been attributed to the field cancerisation

effect and this should be kept in mind during pre-treatment investigations and post-treatment follow up. Management of these patients should provide a good control of the disease and a better functional outcome in terms of speech and most importantly swallowing. Post-treatment rehabilitation is an essential element in treating these cases.

AIM OF THE STUDY

- To evaluate association of risk factors with tongue cancers
- To find out the age specific incidence and male:female ratio
- To find the stage at presentation
- To find out the site of commonest presentation anterior or posterior tongue
- To assess the pattern of cervical metastasis from tongue cancer in relation to T status and location of cancer
- To find out the number of patients taken for primary radiotherapy and its response
- To study the role of surgery in management of primary and neck nodes
- Compare the outcome of surgery following chemotherapy and radiotherapy
- To study the role of chemotherapy in management of tongue cancer
- To compare my results with literature

MATERIALS AND METHODS

All patients who reported at oncology department diagnosed as a carcinoma tongue at Government Royapettah Hospital were included in the study.

The patients either came to department directly or were referred from other departments and other hospitals after proving the malignancy by Histopathological examination.

The study period was 25 months from September 2005 to September 2007.

Diagnosis was confirmed by HPE of specimen obtained by wedge biopsy of ulcer / growth.

Detailed history regarding duration of symptoms, habits like smoking, alcoholism, tobacco chewing were obtained. Baseline investigation which included a complete hemogram, blood biochemistry, X-Ray chest and X-ray mandible as required were done.

Special investigation like MRI and CT scan done in few selected cases.

A thorough physical examination was done to assess the size and extent of tumour presence or absence of Ankyloglossia, involvement of adjacent structures. Nodal status was assessed clinically. Finally staged according to TNM staging. Early cases categorized to T1-T2 advanced cases to T3-T4.

The protocol followed at oncology department GRH is to subject the patient with advanced disease to combined modality compiling Radiotherapy and surgery.

Radiotherapy was given as external beam Radiotherapy using radioactive cobalt 60.

Dosage used in a range of radiation schedule was 4000-6000 CGY.

200 CGY / day for 5 days a week for 5-7 weeks.

Criteria for Response

Complete regression of tumour and node was taken as complete response. Presence of residual lesion was considered as partial response.

Surgery was done in the form of Hemi glossectomy, Partial glossectomy, sub total / Total glossectomy and composite resection.

Management of neck nodes

Supra omo hyoid neck dissection (SOHND) in selective cases, Modified radical neck dissection (MRND) type I and Radical neck dissection (RND).

Few cases towards end of my study protocol underwent palliative chemotherapy.

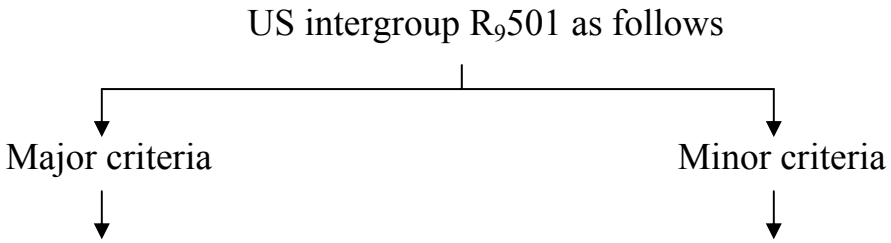
FOLLOW UP

Complete regression of the lesion were followed up with observation.

Residual lesions were followed with Radiotherapy chemotherapy or surgery.

After complete surgical resection adjuvant radiotherapy was given for advanced cases.

Case Criteria



1. Margins positive

2. Extra capsular nodalspread

1. High grade tumour

2. Lymphovascular invasion

3. Perineural invasion

4. Multiple positive nodes without extracapsular nodalspread

Presence of one major or two minor criteria in post operative patients should receive standard post operative Radiotherapy or same radiotherapy with cisplatin 100 mg/m^3 every 3 weeks in 3 doses.

LIMITATIONS

1. There was a very high drop out rate even at the initial stage of study. Some patients were not willing for salvage surgery after RT.

2. Because of short period available, patients could be followed for a minimum period only. Hence adequate data regarding tumour free interval, survival period, exact recurrence rate were not available.

3. Since most of the patients present at late stage of disease, proper evaluation of primary RT and surgery in early stage of disease could not be studied.

REVIEW OF LITERATURE

ANATOMY

The tongue, organ of taste, speech, mastication and deglutition, is a mass of skeletal muscle covered by mucous membrane and with amidline fibrous septum separating the two muscular halves. It is divided into anterior and posterior part by a V-shaped sulcus called sulcus terminals. The stratified squamous epithelium is keratinized on the oral part and non-keratinised on the pharyngeal part.

The mucous membrane of the anterior two thirds of the dorsum is roughened by the presence of three types of papillae:

Filliform papillae	-	No taste buds
Fungiform papillae	-	Few taste buds
Vallate papillae	-	In front of sulcus terminalis Numerous taste buds and glands in the sulcus that surrounds each vallate papilla

The posterior third of the tongue is behind the sulcus terminalis and at the apex of the sulcus is a small depression, the foramen caecum. There are no papillae behind the sulcus. The smooth mucous membrane has a nodular appearance from the presence of underlying masses of mucous and serous glands and aggregation of lymphoid follicles. Foliate papillae are a series of parallel folds of mucous membrane on the side of posterior part, site of numerous taste buds.

MUSCLES

Muscles of tongue are divided into intrinsic and extrinsic groups

The muscles of the intrinsic group are the superior longitudinal, inferior longitudinal, transverse and vertical.

The extrinsic group comprises genioglossus, Hyoglossus, styloglossus and palatoglossus.

DEVELOPMENT

Tongue muscles are derived from occipital myotomes.

Epithelium

a) Anterior 2/3rd – tuberculum impar and two lingual swellings i.e. from first branchial arch.

b) Posterior 1/3rd – Midline Hypobranchial eminence (third arch) and posterior most from the fourth arch.

BLOOD SUPPLY

Artery

- Lingual artery, a branch of external carotid artery
- Small contribution to root from tonsillar branch of facial artery and ascending pharyngeal artery
- The fibrous septum dividing the two halves of tongue prevents any significant anastomosis of blood vessels across the midline

Venous Drainage

- Lingual vein
- Deep lingual vein – from the tip visible on the undersurface

- DLV joined by sublingual vein to form vena comitans of the hypoglossal nerve

- DLV joins the lingual vein or facial or anterior jugular vein

- Lingual veins usually joins the IJV

Nerve Supply

Motor

Hypoglossal nerve (except palatoglossus)

Sensation – Anterior 2/3rd

Taste – Chorda tympani of lingual nerve

Common sensation – Trigeminal Component of lingual nerve

Posterior 1/3rd

Taste & Common sensation – Glossopharyngeal nerve

Lymph drainage

A significant feature of tongue's lymph drainage is that lymph from one side, especially of the posterior part, may reach nodes on both sides of neck.

Tip	-	Submental nodes or directly to deep cervical nodes
Lateral	-	Ipsilateral submandibular or directly to deep cervical nodes
Central	-	Deep cervical nodes of either side
Posterior part-		Directly and frequently bilateral to deep cervical nodes

Deep nodes usually involved are the jugulodigastric and jugulo-omohyoid nodes.

LEVEL OF NECK NODES

Level I	-	Submental group
Level II	-	Around the upper third of IJV and spinal accessory nerve

from the skull base down to level of carotid bifurcation (Hyoid bone on CT)

Level III - Around the middle third of IJV from Carotid bifurcation to upper part of cricoid cartilage (where omohyoid crosses the IJV)

Level IV - Lower third of IJV from cricoid cartilage to clavicle

Level V - Along the lower half of spinal accessory nerve and transverse cervical artery. (Posterior triangle group including the supraclavicular nodes)

Level VI - Anterior compartment group from the Hyoid bone to suprasternal notch, laterally between the medial border of the two sternomastoid muscle.

Lever VII - Mediastinal nodes

ETIOLOGY AND PREMALIGNANT CONDITIONS

Life-style habits and social factors have a major impact on development of tongue cancer. Epidemiological studies have shown that use of alcohol, tobacco (smoked or smokeless) and betelnut and panproducts is associated with a high risk.

TOBACCO

The relationship between tobacco exposure to oral mucosa and disease development has been demonstrated strongly. A clear dose-response relationship has been identified, with a greater risk being directly proportional to intensity and duration of exposure. Risk decreased only gradually after cessation of tobacco.

Tobacco exposure can be by means of smoking or by smokeless tobacco. The risk of malignancy is six-times that of non-smokers.

The risk of cancer was found to increase four-times in use of smokeless tobacco. Smokeless tobacco is available in many forms like it is chewed alone or with pan (betel leaf, catechu, areca nut and slaked lime) or as a commercially available pan masala. Smoking and chewing tobacco was found to have a synergistic effect.

ALCOHOL

Alcohol is another strong independent risk factor for cancer with a multiplicative effect from combined exposure with tobacco. Alcohol may act as a promoter, an irritant or solvent to increase the solubility of carcinogens from tobacco leading to development of cancer. Experimental evidence suggests that alcohol suppresses the efficiency of DNA repair after exposure to nitrosamine compounds. Indirectly vitamin deficiency and poor detoxifying capability due to alcohol – induced liver function may promote carcinogenesis.

DIET AND NUTRITION

Dietary factors may also have a role in the development of cancer. Diets having fresh fruit and vegetables, particularly those rich in vitamin A, have a protective effect against cancer and precancer.

OTHER RISK FACTORS

Poor dental hygiene and chronic irritation from ill-fitting denture or a sharp tooth have also been implicated. Genetic susceptibility is another

proven risk factor. A direct link between human papilloma virus and oral cancer remains to be established.

Smoke, spirit, spicy food, syphilis, sepsis sharp tooth and susceptibility the S's to be remembered in the etiology of oral cancer.

PREMALIGNANT CONDITIONS

Leukoplakia

Any white patch or plaque that cannot be characterized clinically or pathologically as any other disease. Tobacco smoking and chewing are undoubtedly important etiological factors. Leukoplakia may persist, regress spontaneously, recur or progress to cancer. The incidence of ultimate malignant change in oral leukoplakia increases with increasing age of the lesion. Studies have shown that leukoplakia of floor of mouth and ventral surface of tongue has a particularly high incidence of malignant change. This was due to pooling of soluble carcinogens in the sump of the floor of the mouth. Oral cancer develops in 3-6% of leukoplakias. Nodular or speckled leukoplakia are the most likely to undergo malignant change.

ERYTHROPLAKIA

Any lesion of the oral mucosa that presents as bright red velvety plaques which cannot be characterized clinically or pathologically as any other recognizable condition. The incidence of malignant change in erythroplakia is 17-fold higher than in leukoplakia.

SYPHILITIC GLOSSITIS

Prior to the antibiotic era syphilis was an important predisposing factor in the development of oral leukoplakia and cancer. The syphilitic infection produces an interstitial glossitis with an endarteritis which results in atrophy of the overlying epithelium. This atrophic epithelium appears to be more vulnerable to other irritant which cause cancer. It should be noted that squamous cell carcinoma may arise in syphilitic glossitis even in the absence of leukoplakia.

SIDEROPENIC DYSPHAGIA (Plummer – Vinson Syndrome)

The sideropenic dysphagia leads to epithelial atrophy, which in itself is excessively vulnerable to carcinogenic irritants.

SUBMUCUS FIBROSIS

Most important precancerous condition in India. It is characterized by Juxta-epithelial fibrosis with atrophy or hyperplasia of overlying epithelium which also shows areas of dysplasia.

ORAL LICHEN PLANUS

The relation of lichen planus with malignancy exists with erosive or atrophic lichenplanus.

CLINICAL FEATURES AND INVESTIGATIONS

The goal of evaluating a patient with oral cancer is to assess the extent of disease and to define the tumour type histologically.

The majority of tongue cancer present with persistent ulcer or sore. It can also present with growth which is exophytic with areas of ulceration. The ulcer is hard in consistency with heaped-up and everted edges. The floor is granular, indurated and bleeds readily. Infiltration into deeper tissues cause pain. Pain can also radiate to ears due to irritation of the lingual nerve which is referred to auriculotemporal nerve.

Patient can also present with profuse salivation, this is partly due to irritation of nerves of taste and partly due to difficulty in swallowing.

Ankyloglossia, that means inability to protrude the tongue is due to infiltration of lingual musculature by cancer. There may be fetor oris (offensive smell), difficulty in speech and swallowing more often in posterior third tongue cancer.

Growths at the posterior third of tongue often escapes notice and in these cases alteration of the voice, dysphagia and neck swelling will be the primary symptoms.

INVESTIGATIONS

The clinician should evaluate any medical and nutritional problems. Common problems in patients with cancer are hepatic disease, pulmonary disease and malnutrition. Dental consultation should be obtained for any sharp tooth or other precipitating factors and if radiation is being planned.

1. Biopsy of the lesion is mandatory before treatment. This can be done under local anaesthesia. The biopsy should be deep and encompass a portion of tumour as well as adjacent normal appearing mucosa (Wedge biopsy). Areas of necrosis or gross infection should be avoided as they may confuse the diagnosis. Toludine blue staining can be used to target biopsies but has a high false positivity as inflammatory and non-cancerous lesions also stain. It is not routinely recommended.

2. Fine needle aspiration cytology is applicable mainly to lumps in the neck, especially suspicious lymph nodes in a patient with known primary carcinoma.

3. Chest X-Ray

4. Plain radiograph is of limited value in assessing mandible involvement become atleast 50 percent of the calcified component of bone must be lost before any radiographic change is apparent.

5. In this situation orthopantomogram will be effective but is limited in the ability to evaluate the symphysis and lingual cortex.

6. CT of the mandible can be used in selected cases where the above imaging is inadequate. CT gives information regarding the extent of mandibular involvement, malignant infiltration and cervical nodal disease.

7. MRI can be used to determine soft tissue and perineural involvement. MRI gives excellent definition of the extent of cancer involving the tongue and may be especially useful where lesions are not visible on CT.

Indication for CT are

a. in lesions abutting the mandible

b. where marginal mandibulectomy is being planned

c. to evaluate the clinically negative (No) neck

d. in patients with large nodes to look for carotid artery involvement

8. Laboratory investigations – These are non-specific and done to evaluate the patient's fitness for surgery and to exclude concurrent medical illness. These usually include a full blood count and renal and liver function tests.

9. Dental consultation – dental scaling, removal of caries tooth.

10. Laryngoscopy, bronchoscopy and oesophagoscopy for finding out any other primary lesions associated field cancerisation.

STAGING

TNM staging is a clinical staging system that allows to design treatment modality compare results and assess prognosis.

PRIMARY TUMOUR (T)

Tx - Primary tumour cannot be assessed

T0 - No evidence of primary tumour

Tis - Carcinoma insitu

T1 - Tumour not more than 2 cm in greatest dimension

T2 - Tumour more than 2 cm and not more than 4 cm in greatest dimension

T3 - Tumour more than 4 cm in greatest dimension

T4 - Tumour invades adjacent structures
(cortical bone, deep muscles of tongue etc.)

NODAL INVOLVEMENT

Nx - Nodal status cannot be assessed

N0 - No regional lymph node

N1 - Presence of single ipsilateral lymphnode not more than 3 cms in greatest dimension

N2:

N2a - Single ipsilateral node more than 3 cm but not more than 6 cms in greatest dimension

N2b - Multiple ipsilateral lymphnode none more than 6 cm in greatest dimension

N2c - Bilateral or contralateral lymphnode none more than 6 cms in greatest dimension

N3 - Lymphnode of any side more than 6 cm in greatest dimension

DISTANT METASTASIS

Mx - Distant metastasis cannot be assessed

M0 - No distant metastasis

M1 - Presence of distant metastasis

STAGE GROUPING

Stage	0	Tis	N0	M0
State	I	T1	N0	M0
Stage	II	T2	N0	M0
Stage	III	T3	N0	M0
		T1	N1	M0
		T2	N1	M0
		T3	N1	M0
Stage	IVA	T4	N0	M0

		Any T	N1	M0
		Any T	N2	M0
Stage	IVB	Any T	Any N	M1
Stage	IVC	Any T	Any N	M1

LIMITATION OF TNM STAGING

Important prognostic factor such as fixation of nodes and level of nodal status is not included. False negative physical examination varies from 16-60%.

NODAL STATUS

The risk of nodal metastasis from oral cancer is related to several factors site of the primary, T stage, depth of invasion, histological grade, vascular and perineural invasion.

Tumours of tongue have the highest incidence of neck nodes in oral cavity cancers.

Tumour thickness ≥ 2cm carry a higher risk of metastasis to regional lymphnodes.

Endophytic tumours, poor differentiation, increasing T stage and neurovascular invasion increase the risk of lymph nodal spread.

Positive neck nodes, multiple nodal metastasis carries worse prognosis. Extranodal spread is associated with 50% reduction in survival when compared with nodes without extranodal spread. Nodes with lymphocyte predominant pattern is associated with a good prognosis.

There is early nodal involvement in posterior third of tongue lesions and incidence of bilateral nodal involvement was more in the same.

The level of node in anterior lesion was level II (jugologastric nodes). Nodes within level I, III and IV are more frequently involved than many other cancers of the head and neck such as oral cavity lesions.

DISTANT METASTASIS

Distant metastasis from primary squamous cell carcinoma of tongue at the time of initial diagnosis are exceedingly rare. The presence of advance

disease and failure at primary site or neck after treatment are often associated with a high risk of distant metastasis.

The most common site for distant metastasis are lungs and bones. T_4 lesions and four or more positive nodes are associated with increased incidence of metastasis.

PRINCIPLES OF RADIOTHERAPY

Cancer of tongue are of particular interest to radiation oncologists. They have an active role in early and advanced disease. The twin advantage is easy accessibility and relative tolerance of normal tissue.

TECHNIQUES

1. Total dose of definitive radiation therapy is usually 60-65gy to primary and neck for clinically evident disease and atleast 60 Gy for low-risk cervical disease.

2. Post operative adjuvant RT – 60 Gy or more to primary and neck.

3. Brachytherapy – 20-30 Gy to primary along with EBRT.

INDICATIONS

Tumour Control

Particularly for small tumour (T1-T2) in both anterior and posterior tongue.

Clinically N_0 neck

If primary tumour is being treated with definitive RT, then nodes are treated electively with external beam radiotherapy.

Pre-operative

For advanced (stage III/IV) or inoperable stage-help in down- staging to more operable stage.

Disadvantages

- Wound healing delayed due to fibrosis,
- Assessment of tumour margin will be difficult.

Post-operative

To Primary

i) In patients with T3/T4 primary.

ii) Residual microscopic tumour or positive margins.

To neck

i) Extracapsular spread.

ii) Pathologically positive lymph nodes after selective neck dissection.

iii) Multiple positive lymphnodes after radical neck dissection.

Advantages

i) Sterilization of residual microscopic cells.

ii) Better assessment of tumour margin.

Disadvantages

i) Surgical complication may delay the initiation of radiotherapy.

Palliative

When tumour is considered surgically or radio therapeutically incurable, a few high dose fraction are given in order to decrease symptoms such as pain & bleeding.

Tumour Recurrence After Surgery

EBRT is used for local control. Reexcision surgery can also be selected if feasible.

ADVANTAGES OF RT

- Centripetal Shrinkage of Tumour.
- Sterilises lymphatics
- Facilitates adequate clearance.
- More useful in ill – defined, posteriorly placed tumour.
- Functional disability (speech / deglutition) is less.

SIDE EFFECTS OF RT

Acute

- Mucositis
- Xerostomia (Dry mouth)
- Dysguesis (Loss of taste)
- Dysphagia
- Erythema
- Epidermolysis

Late

- Soft tissue necrosis
- Osteroradionecrosis of mandible
- Hypothyroidism

PRINCIPLES OF SURGERY

Early stage disease can be managed either by radiotherapy or surgery. Both are proved to give equally good results.

Advanced lesions need a combination of both radiotherapy and surgery. Nodes larger than 3 cms, nodes with capsular infiltration and multimodality treatment.

When combination of surgery or radiotherapy is used, either could be used first depending on the philosophy of treating institution.

Resected margins should be free from microscopic involvement of cancer. Positive surgical margin carries poor prognosis. Frozen section histopathology can be utilized to verify microscopically negative margins.

Whenever composite resection is carried out for advanced lesions, the resulting excisional defects should be primarily reconstructed. This allows prompt healing, early resumption of activities effective rehabilitation and shorter hospital stay.

ADVANTAGES

Many cancers of oral cavity are amenable to surgical excision by oral approach.

Surgical treatment is required in almost all patients with advanced tumours.

Requires less time and provides fewer long – term sequelae.

Delineation of anatomy will be easier with primary surgery compared to surgery after radiotherapy.

Histopathological examination of post – operative specimen will be accurate after primary surgery.

DISADVANTAGES

Potential risk anaesthesia

Post- operative complications

- Local
- Respiratory

Functional Disabilities

- Speech
- Deglutition
- Cost

Available Surgical procedures for primary

- Wide local excision
- Hemiglossectomy
- Total glossectomy
- Total resection of tongue base with total largectomy

Primarily for T_4 posterior lesions.

Composite resection – refers to resection of a portion of tongue, floor of mouth and segment of mandible.

Surgical approaches for tongue resection

- Transoral
- Mandibulotomy
- Pull through procedure
- Lateral pharyngotomy

Cervical node metastasis

The surgical options available managing neck node are.

1) Selective neck dissection
2) Radial neck dissection
3) Modified radical neck dissection

Selective neck dissection

For T1-T_4 lesions and clinically No, neck, provided the neck is not previously violated, selected neck dissection is carried out.

The selective neck dissection in case of tongue cancer is supraomohyoid neck dissection (SOHND). In SOHND, the nodal levels dissected are I-III. The three non-lymphatic structures removed in radical neck dissection are preserved in SOHND. There is controversy regarding managing N_0 neck, whether to observe or to carry out SOHND.

Arguments for neck surgery

- High incidence of occult metastatic disease
- If limited, neck dissection has a low morbidity and mortality.
- It is impossible to provide the clinical follow-up necessary to detect the earliest from N_0 to N_1.
- Allowing neck metastasis to develop increases the incidence of distant metastasis
- Cure rate for neck dissection is decreased if gland enlargement occurs or multiple nodes appears.

Arguments against elective neck surgery

- Radiation is as effective as neck dissection for non-palpable disease.

- Results in a number of unnecessary surgical procedures associated with inevitable morbidity.

- Elective neck dissection removes the barrier to the spread of disease and may have a detrimental immunological defect.

- Elective neck dissection gives no guarantee against recurrence of tumour in the neck.

- There is no prospectively controlled trial to support the argument that elective neck dissection does improve the prognosis.

Radical neck dissection

The operation removes the lymph-node in the levels I – V and all three non- lymphatic structures (spinal accessory nerve, sternomastoid and internal jugular vein.)

Indicators

Significant operable neck disease (N1, N2a, N2b)

Some cases of N2c / N3

Access prior to pedicled flap reconstruction.

Contra- indications

Untreatable primary tumour

Patients unfit for major surgery

Distant metastasis significant bilateral neck disease

Inoperable neck disease

Modified Radical Neck Dissection

The operation consists of the removal of lymph node levels I- V with preservation of one or more non- lymphatic structures.

MRND Type	Structures preserved
I	Spinal accessory nerve
II	SAN and IJV
III	SAN, IJV and sternomastoid

RECONSTRUCTION

When performing surgical excision of less than one third of the tongue, formal reconstruction is not necessary. Indeed the best results are obtained by attempting to close the defect or to apply a quilted split- skin graft. The base of the residual defect should be fulgrated and then allowed to granulate and epitheliase spontaneously.

If the volume of the tongue defect does not exceed thirds of the original tongue, a radial forearm free flap with microvascular anastomosis gives a functional result.

For very large volume defects, for total glossectomy or for deeply infiltrating tumours, when the resection extends to the hyoid bone, more bulky flaps are required to fill in the deadspace and prevent food pooling. A pectoralis major myocutaneous flap is the best method.

PRINCIPLES OF CHEMOTHERAPY

The role of chemotherapy in tongue cancer is very limited. Chemotherapy can not be used as definitive single modality treatment. Chemotherapy has been in the palliative, neo-adjuvant, adjuvant settings and concurrently with radiation.

1. Palliative
   - In recurrent cases after surgery of RT
   - Very advanced cases.

2. Previously Untreated cases
   - Neo adjuvant (On going trials – Result awaited)
   - Adjuvant
   - Concurrent with radiation

Drugs commonly used are

- Methotrexate
- 5- fluorouracil

- Cisplatin

- Bleomycin

- Ifosfamide

Cis-platin based combination chemotherapy is more effective than single-agent chemotherapy.

Patients with poor performance status should not be given palliative chemotherapy but only symptomatic and supportive treatment.

OVERVIEW OF TREATMENT

ANTERIOR LESIONS

Stage I and II - Surgery or Radiotherapy

↓

Equally effective

Stage III and IV - Surgery followed by Post-operative RT or RT followed by surgery

Posterior lesion

Early stage - Surgery or Radiotherapy

Advanced Stage - Surgery with post-operative RT or Chemotherapy and RT, reserving surgery for salvage.

OBSERVATIONS AND RESULTS

A total 63 patients were treated at the Department on Oncology, Government Royapettah Hospital, Kilpauk Medical College from September 2005 to September 2007.

The following observations were made. Among the total 63 cases of tongue cancer, the maximum amount of cases occurred in 4^{th} to 6^{th} decades of life accounting for 62% of cases. Of these, males predominate and constituted 73% of cases. The male:female ratio was 3:1.

Table I

AGE AND SEX INCIDENCE

Age	Male	Female	Total
21-30	-	-	-
31-40	6	3	9
41-50	15	4	19
51-60	13	2	15
61-70	18	2	20
71-80	-	-	-
Total	52	11	63

Regarding the site of cancer, among the 63 cases, 42 cases had cancer in oral (anterior) tongue and 21 cases were found to have lesion in the posterior tongue.

77% of cases were T3 and T4 lesions. 64.5% of cases were N1 and N2 nodal involvement.

Table II

STAGE AT PRESENTATION

Primary Lesion		**Node**		**Metastasis**	
T1	12	N0	16	M0	63
T2	16	N1	18	M1	0
T3	20	N2	24		
T4	13	N3	5		

Table III

RISK FACTORS

Risk	No. of Cases
Smoking and alcohol	40
Tobacco chewing	6
Pan masala	5
No risk factor	12

Nodal involvement in T1 & T2 lesions were present only in 27.3% of cases. But 83.8% of T3 and T4 lesions presented with palpable neck nodes. Nodal involvement was more in posterior tongue lesions (85%) compared to oral anterior tongue cancer (60.7%).

Table IV

PATTERN OF CERVICAL METASTASIS

	Total Cases	Palpable nodes	No neck
T1 & T2	28	13	14
T3 & T4	33	29	3
Anterior tongue	40	23	16
Posterior tongue	23	17	2

External beam radiotherapy played an important role in management of tongue cancers. Thirty cases were taken for primary radiotherapy. Of these five cases defaulted their treatment. There was residual lesion in 3 cases. Among these 3 cases, 2 were taken for surgery like composite resection and hemiglossectomy. Even though surgery was feasible in some of these cases, few patients were not willing for post RT surgery.

30 cases were taken for primary radiotherapy. 3 cases had residual lesions, thus can be improved if external beam radiotherapy is combined with brachytherapy.

Total 26 patients were taken up for primary surgery (Hemiglossectomy, Hemiglossectomy with neck dissection or composite resection).

Table V

PRIMARY SURGERY

Procedure	No. of Cases	Total
Wedge excision	4	26
Hemiglossectomy	13	
Hemiglossectomy with SOHND	2	
Hemiglossectomy with RND	2	
Composite resection with PMMC flap	3	
Composite resection with MRND	2	
Neck dissection	2	
Observation	5	

RESULT OF THE STUDY

Total number of patients	63
4^{th} and 6^{th} decade	61%
Male:Female	3:1
Anterior tongue lesion	42
Posterior tongue lesion	23
Stage T3 and T4 N1 and N2	80% 63%
Smoking and alcoholism in	70% of cases
Nodal involvement T1 & T2 T3 & T4 Anterior tongue Posterior tongue	27.3% 83.8% 60.7% 85%
Radiotherapy Palliative Primary RT No residue Residue Defaulted	20 30 24 2 5
Primary Surgery	24
Post – RT Surgery	2
Chemotherapy	6

DISCUSSION

In a total of 63 patients tested in present study the maximum age incidence was in 4^{th} to 6^{th} decades of life. Nil cases found in the age group of 2^{nd} and 3^{rd} decades, 7^{th} and 8^{th} decades of life.

Majority of cases were male predominance because of uses of smoking, alcoholism, panproducts. This was in comparison to study by MEHROTRA published in Indian Journal Medical Science in which the maximum incidence was in age group 51-60 years and male:female ratio was 3.27:1.

COMPARISON STUDY

AGE AND SEX INCIDENCE

Contents		Present Study Percent	KMC Study Percent	Literature Percent
Sex	Male	73	70	75
	Female	27	30	25
Age	40-50 yrs	30	37	60
	50-60 yrs	24	23	
	60-70 yrs	32	17	

There is a strong association of cancer tongue with addiction habits like smoking, alcoholism, tobacco chewing and use of panproducts. Among the cases, the main risk factor smoking and alcoholism was found in 70% of cases. According to study by BARASCH, the percentage of smokers among cases of tongue cancer was 64%.

RISK FACTORS

Contents	Present Study Percent	KMC Study Percent	Literature Percent
Smoking	70	63	64
Alcoholism			
Panproducts			

SITE

Anterior site lesions in the tongue are about 70%, Posterior lesions are 30%. According to study by MITCHELL anterior lesions are about 72%, posterior lesions are 28%.

	Present Study Percent	KMC Study Percent	Literature Percent
Anterior	70	71	72
Posterior	30	29	28

Regarding the stage of presentation at the time of diagnosis, most of them were advanced lesions. Public awareness is to be created so that patient will present at the department in early stages which would offer a better cure.

STAGE

	Present Study Percent	**KMC Study Percent**	**Literature Percent**
T1-T2	33	35	33
t3-t4	77	75	72

The neck node involvement was influenced by the T status and location of tumour. According to a study in Trivandrum (world Journal of Surgery Oncology) cervical metastasis was present in 35.6% of T1, T2 lesions and 62.3% of T3, T4 lesions with level II being commonly involved.

NODES

	Present Study Percent	KMC Study Percent	Literature Percent
N0	25	27	24
N1	28	25	27
N2	38	37	36
N3	7	6	8

According to study by LINGC and GRAS JR, Clinically negative neck patients in stage I can be observed, but for T2 lesions – SOHND and T3, T4 lesions – functional neck dissection should be done. So prophylactic treatment of No neck would be a better option, for better regional control in lesions above T2.

According to study by REGUEIRO, the response rate to EBRT was 42% which increased to 67% if EBRT was combined with brachytherapy.

TREATMENT

	Present Study Percent	**KMC Study Percent**	**Literature Percent**
Surgery	41	20	35
RT	47	66	52
CT	4	4	5

The role of chemotherapy was limited in tongue cancer.

Primary RT - 30 cases

Palliative CT - 3 cases with advanced lesions

Post RT chemotherapy for residue - 2 cases

Palliative RT - 20 cases

Anterior tongue lesions superceded the posterior lesions.

Most of the cases presented to the department at advanced stage. So measures should be taken to teach the public about early reporting to the hospital so that better cure can be obtained.

Smoking and alcoholism was present in more than 62% of the cases necessitating the need to bring public awareness about ill-effects of tobacco.

Nodal involvement was more in T3 and T4 posteriorly placed lesions. RT played an important role in the management of carcinoma tongue.

CONCLUSION

- Smoking, alcoholism, panproducts are most commonly associated risk factors for carcinoma tongue

- Most common in 4^{th} to 6^{th} decade of life Males are more commonly affected than females in the ratio of 3:1

- Stage III, IV are common presentation in Carcinoma tongue

- Anterior $2/3^{rd}$ is the commonest site of involvement

- Nodal involvement was common in T3 and T4 lesions, posteriorly placed lesions

- Majority of early lesions (T1 and T2) are best treated surgicaly

- Few cases were down staged by using pre operative radiotherapy and chemotherapy followed by surgery.

- Chemotherapy is mainly palliative measure

- The observation and results of the study are in accordance with similar study in literature.

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PROFORMA

Name :

Age :

Sex

Registration No. :

Date of Admission :

Date of Discharge :

Risk factors & Duration

Symptoms

- Ulcer
- Growth
- Pain, Bleeding
- Functional Disability

Examination

- Site
- Extension
- Size
- Neck Nodes

Staging - TNM

Investigation - Biopsy

- Hemogram
- CXR
- CT, MRI

HPE report

Primary Treatment

Outcome

Adjuvant Treatment

Follow – up

MASTER CHART

S.No.	Name	Age/Sex	IP No.	Risk factors	Site	TNM	HPE	Primary Treatment	Outcome	Adjuvant RT/CT	Post RT Surgery
1	Dhanam	75/f	1511/06	-	Postetrior1/3	T3N0M0	adenosquamous	Pallattive RT			
2	Nagaraj	60/m	1300/06	S,A	Postetrior1/3	T2N 2MO	SCC	L Hemiglossectomy withRND		CT	RT
3	Abdul	63/M	141106	C	Postetrior1/3	T2N2M0	SCC wd	RT			
4	Swaminathan	43/M	1810/06	S,C	Postetrior1/3	T4N2M0	SCC PD	RT	POST RT resection		Totalglossectomy Compposite resection
5	Muthu	72/M	1076/06	S,c	Postetrior1/3	T4N1MO	SCC md	RT			
6	Mari	54/m	1236/06	S	Postetrior1/3	T4N3M0	SCC	Palliative RT			
7	Anandha raj	42/m	1526/06	S,A	Anterior 2/3	T4N 2MO	SCC wd	RT			
8	Hussain	65/m	1450/06	S,C	Anterior 2/3	T2N0M0	adenosquamous	Wide excision			
9	Sundaram	40/m	1417/06	s	Anterior 2/3	T4N 2MO	SCC wd	RT			
10	Ramani	64/f	1383/06	c	Anterior 2/3	T4N 0MO	SCC	R. Hemiglossectomy with SOHND		CT	
11	Nataraj	64/m	710/06	S,C	Anterior 2/3	T2N 1O	SCC	Compposite resection with PMMCflap			
12	lalitha	60/f	1546/06		Anterior 2/3	T1N2M0	SCC	R. Hemiglossectomy			
13	Saravanan	60/M	230/07	SC	Posterior1/3	T4N1M0	SCC	RT		CT	
14	Danasekar	72/M	1206/06	S,C	Anterior 2/3 CROSSDING MIDLINE	T2N2M0	SCC wd	RT			NWS
15	Lakshmi	46/f	1129/06	C	Anterior 2/3	T4N2M0	SCC PD	RT			
16	Jeyaraman	32/M	1338/06	S,C,P	Anterior 2/3	T4n2m0	SCC	RT			
17	selva	50/m	1631/06	S/C	Anterior 2/3	T1N0M0	SCC Wd	R Hemiglossectomy withSOHND			
18	babu	39/m	11631/06	S,P	Anterior 2/3	T1N0M0	SCC Wd	R Hemiglossectomy	Nodes after 8 mnths		RND
19	Dhayalan	50/M	864/06	S,C	Anterior 2/3	T4N1M0	SCC PD	RT			
20	Syed	42/m	488/06	S,C,P	Anterior 2/3	T2N1M0	SCC	Lt Hemiglossectomy with PMMCflap			RT
21	Mohan	60/m	981/06		Anterior 2/3	T3N0M0	SCC	RT			
22	Palani	63/m	1031/06	S,C	Anterior 2/3	T3N1M0	SCC	RT			
23	RANI	45/F	1061/06	C	Anterior 2/3	T2N2M0	SCC	RT			NWD
24	Perumal	63/m	235/06	S,C	Posterior1/3	T4N1MO	scc	RT		CT	
25	Selvam	32/M	1295/06	S,A,P	Anterior 2/3	T2N1M0	SCC	Lt Hemiglossectomy with Type 1 MRND			
26	Prem	56/m	571/07	S,A	Posterior1/3	T34N2M0	SCC	RT			
27	Palani	67/m	537/07	S,A	Posterior1/3	T34N2M0	SCC	RT			
28	Balu	48/m	5148/07	S	Anterior 2/3	T1N0M0	SCC	Partialglossectomy			
29	Pondy	68/m	430/07	S,C	Anterior 2/3	T1N0M0	SCC	Wide Excision			
30	Rani	43/f	488/07	C	Anterior 2/3	T3N1M0	SCC			Pallative RT ,CT	
31	Anbu	50/m	492/07	S,A	Posterior1/3	T3N2M0	SCC	RT			

32	Muthu	43/m	403/07	S	Central	T2N2M0	SCC			RT,CT	
33	Basha	65/m	380/07	S,C	Anterior 2/3	T2N0M0	SCC	Compposite resection with Type 1 MRND			
34	Kumar	60/m	1081/07	S,C	Hemiglossectomy	T34N3M0	SCC	RT		CT	
35	Raja	34/m	1308/07	S,P	Anterior 2/3	T4N2M0	SCC	RT,CT		CT	
36	Sakunthala	35/f	434/07		Anterior 2/3	T1N0M0	SCC	Wide Excision			
37	Mallika	53/f	238/07	C	Anterior 2/3	T2N0M0	SCC	RT			
38	Annamalai	45/f	217/0-7	C	Anterior 2/3	T1N0M0	SCC	Hemiglossectomy			
39	Sandhanam	30/m	155/07	S,P	Posterior1/3	T3N3M0	SCC	RT			
40	Lalitha	60/f	153/07	C	Anterior 2/3	T1N1M0	SCC	Hemiglossectomy with RND			
41	Madhavan	40/m	541/07	S,C	Posterior1/3	T4N3M0	SCC	RT		CT	
42	Kumari	65/f	66/07		Anterior 2/3	T1N0M0	SCC	Hemiglossectomy			
43	Shanmugam	45/m	25/07	S,C	Anterior 2/3	T4N2M0	SCC	RT			
44	Prama	64/m	24/07	S,C	Posterior1/3	T4N3M0	SCC	RT,CT			
45	Kasim	53/m	93/07	S,C	Posterior1/3	T3N0M0	SCC	RT			
46	Veeran	45/m	44/07	S	Posterior1/3	T4N1M0	SCC	RT			
47	Rethinam	53/m	400/07	C	Posterior1/3	T4N1M0	SCC	RT			
48	Selvi	64/f	1383/07		Anterior 2/3	T1N2M0	SCC	Hemiglossectomy with SOHND			
49	Sundar	44/m	1250/07	S	Anterior 2/3	T2N1M0	SCC	Compposite resection			
50	Mani	65/m	1349/07	S,C	Anterior 2/3	T3N1M0	SCC	Hemiglossectomy with RND			CT,RT
	Hussian	44/m	1450/07	S	Anterior 2/3	T2N0M0	SCC	Wide Excision			
51	Murugan	54/m	1542/07	S,C	Anterior 2/3	T2N0M0	SCC	Compposite resection with PMMCflap			
52	Thangam	56/f	1546/07		Posterior1/3	T4N2M0	SCC	RT With Hemiglossectomy with RND			
53	Sethu	60/m	1310/07	S,C	Posterior1/3	T4N1M0	SCC	RT			
54	Syed	40/m	485/07	S,C	Anterior 2/3	T2N1M0	SCC	Hemiglossectomy with PMMC flap			
55	Raman	50/m	864/078	S,C	Anterior 2/3	T4N1M0	SCC	RT			
56	Raja	48/m	865/07	S	Anterior 2/3	T4N2M0	SCC	RT			
57	Ramaraj	37/m	1089/06	P	Anterior 2/3	T3N1M0	SCC	RT	Residue		Compposite resection
58	Arun	32/m	1295/07	P,S	Anterior 2/3	T2N1M0	SCC	Hemiglossectomy with MRND			
59	Manoj	39/m	1107/07	S,A	Anterior 2/3	T1N0M0	SCC	Hemiglossectomy	Nodes after 7 mnths		MRND done
60	Manju	46/f	1267/07	C	Anterior 2/3 with posterior extension	T4N2M0	SCC	RT, CT		CT	
61	Jeyaraman	45/m	138/07	S,C	Posterior1/3	T4N2M0	SCC	RT		CT	
62	Palayam	50/m	1031/07	S,C	Anterior 2/3	T3N3M0	SCC	RT			
63	Seetharaqman	65/m	381/07	S,C	Anterior 2/3	T2N1M0	SCC	Compposite resection with PMMC flap			

S - Smoking
A - Alcoholism
P - Panproducts
C - Tobacco chewing
RT - Radiotherapy
CT - Chemotherapy
SOHND - Supra omohyoid node dissection
RND - Radical neck dissection
MRND - Modified radical neck dissection
NWS - Not willing for sugery
SCC - Squamous cell carcinoma
WD - Well differentiated